REMARKS/ARGUMENTS

Favorable reconsideration of this application in view of the above amendments and following remarks is respectfully requested.

Claims 1, 3-8, 10-14, and 16-19 are pending in this application. Claims 1, 8, and 14 have been amended. Support for this amendment is found in the specification on page 13, lines 25-27. It is respectfully submitted that no new matter has been added.

In the outstanding Office Action, Claims 1, 5, 8, 12, 14, and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki et al. (U.S. Patent No. 6,573,912 B1, hereinafter Suzuki) in view of Kawasaki et al. (Image-Based Rendering for Mixed Reality, Proceedings 2001 International Conference in Image Processing, Volume 3, 7-10, Oct. 2001, pages 939-942, hereinafter Kawasaki), Sillion et al. (Efficient Imposter Manipulation for Real-Time Visualization of Urban Scenery, EUROGRAPHICS, Volume 16, No. 3, 1997, hereinafter Sillion), Dobashi et al. (A Simple, Efficient Method for Realistic Animation of Clouds, SIGGRAPH 2000, hereinafter Dobashi) and Han et al. (U.S. Patent Application Publication No. 2003/0052878 A1, hereinafter Han); Claims 6, 13, and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki in view of Kawasaki, Sillion, Dobashi and Han as applied to Claims 12, 14, and 18 above and further in view of Neugebauer (Geometrical Cloning of 3D Objects Via Simultaneous Registration of Multiple Range Images, Proceedings of the IEEE, 1997); Claims 3, 10, and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki in view of Kawasaki, Sillion, Dobashi and Han as applied to Claims 2, 9, and 15 above and further in view of Ogata et al. (U.S. Patent No. 6,313,841 B1, hereinafter Ogata); and Claims 4, 6, 7, 11, and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki in view of Kawasaki, Sillion, Dobashi and Han as applied to Claims 2, 5, 9, and 15 above and further in view of Gannett (U.S. Patent No. 6,118,452).

Applicants express appreciation for the personal interview conducted with Examiner Roberta Prendergast on May 13, 2008. Examiner Kim Nguyen participated via teleconference. The substance of the interview is consistent with the arguments regarding patentability presented below.

Claim 1 has been amended to recite "a billboarding processing unit which rotates the plurality of microfacets to keep the plurality of microfacets substantially vertical to a view direction" and Claims 8 and 14 have been amended to recite "executing a billboarding process that rotates the plurality of microfacets to keep the plurality of microfacets substantially vertical to a view direction." It is respectfully submitted that Claims 1, 8, and 14 as amended are neither disclosed by nor rendered obvious over Suzuki, Kawaski, Sillion, Dobashi, Han, Neugebauer, Ogata, Gannett, or any conceivable combination of those references.

The Office Action states that Suzuki discloses "an intersection processor feeds a voxel calculator in order to determine the volume" and further discloses "generating a plurality of microfacets used to approximate a shape of the geometrical shape model," adding that "it is understood that microfacets are polygons and all voxels are evaluated to determine the object surface which is output as a triangle mesh model." Applicants respectfully disagree. There is no description in Suzuki of the generation of microfacets. For example, Suzuki states in column 9, lines 36-37 "[a]n intersection processor 222 computes the intersections from the silhouettes, and feeds a voxel calculator 224." Suzuki further states in column 9, line 66 that "[a]n intersection processor 322 computes the intersection from the silhouettes, and feeds a voxel calculator 324." Suzuki further describes in column 3, lines 1-5 using voxels to produce a triangle mesh model. There is no description anywhere in Suzuki of the generation of microfacets as recited in Claims 1, 8, and 14. Nor does the Office Action point to any language by column and line in Suzuki where generation of microfacets is described.

Regarding <u>Kawasaki</u>, the Office Action states "the 3D shaped model is a polygonal model indicating that a plurality of microfacets have been generated to approximate the 3D shape of the object being photographed." It is respectfully submitted that there is no such disclosure in <u>Kawasaki</u>. <u>Kawasaki</u> merely discloses in section 2.2 that "each polygon of the 3D object has its own surface normal direction." That is there is no description in <u>Kawasaki</u> of microfacets.

Regarding <u>Sillion</u>, the Office Action states that <u>Sillion</u> describes "the geometrical shaped model is created by extracting interesting contours from the texture image using the depth image and the geometrical shaped model is then triangulated to generate the microfacets" in section 4.2. It is respectfully submitted that there is no such disclosure in section 4.2. That is, <u>Sillion</u> describes extracting interesting contours but never describes generating microfacets. The Office Action additionally states that <u>Sillion</u> describes that microfacets are reprojected in 3D. <u>Sillion</u> actually states "[a]ll vertices of the triangulation is then reprojected in 3D using the information of the depth image and the resulting set of 3D triangles, together with the corresponding texture images, constitute the imposter." There is no description in <u>Sillion</u> of the generation of microfacets.

During the interview the Examiner asserted that microfacets are two-dimensional and are geometric in shape and are therefore the same as a polygon. It is respectfully submitted that there is no support in any of the references of record, particularly <u>Suzuki</u>, <u>Kawasaki</u>, or <u>Sillion</u>, for this assertion.

Regarding <u>Dobashi</u>, the Office Action asserts that "generating a plurality of microfacets as two-dimensional elements that are each centered inside a metaball in a manner to approximate a three-dimensional shape of the geometrical model" is disclosed on page 20, Figure 1, page 21, section 4.1, page 23, Figures 5 and 6, section 5.2.1, without pointing to any specific language to support the assertion. Rather, <u>Dobashi</u> clearly states in the sentence

bridging column 1 and column 2 of page 23 that "[t]hen the billboards are placed at the center

of each metaball." Further, in both Figures 5 and 6 the metaballs are clearly labeled as

containing billboards. Furthermore the discussion of Dobashi bridging pages 6 and 7 of the

Office Action appears to assume that voxels are the same as metaballs. For example the

Office Action states "the billboards are placed at the centers of the metaballs and the

rendering of the clouds is based on a splatting algorithm using billboards such that reducing

the number of voxels by using coarser voxels in regions distant from the viewer results in

fewer metaballs thus reducing the computation time of the splatting process." There is no

such description in Dobashi.

Regarding Han, the Office Action asserts that Han "teaches a splatting process for

generating a plurality of microfacets as two-dimensional elements that are each centered

inside a voxel in a manner to approximate a three-dimensional shape of the geometric model"

citing the Abstract, Figs. 2-4 and 6 and paragraphs [0037] and [0065]. There is no such

description in Han. For example, in paragraph [0037] Han states "so that to obtain local 3D

coordinates of centers of the voxels corresponding to BVO leaves, transforming the obtained

3D coordinates into 2D coordinates of the voxel center and information of size of the

projected voxel image, and generating and displaying, for each BVO leaf, a corresponding

splat covering area of the projected voxel image and using color information, the 3D object

being visualized by a plurality of the displayed splats." During the interview the Examiner

asserted that a splat was the same as a microfacet. However there is no description in Han to

support such an assertion. Furthermore there is no description in paragraphs [0037] and

[0065] of Han of microfacets.

Accordingly it is respectfully submitted that neither Suzuki, Kawasaki, Sillion,

Dobashi or Han disclose a microfacet generation unit which generates a plurality of

microfacets as two-dimensional elements that are each centered inside a respective voxel as

recited in Claim 1 or generating a plurality of microfacets as two-dimensional elements that are each centered inside of respective voxels as recited in Claims 8 and 14.

It is respectfully submitted that Neugebauer, Ogata or Gannett each fail to correct the deficiencies of Suzuki, Kawasaki, Sillion, Dobashi and Han described above.

It is respectfully submitted that Claims 3-7, 10-13, and 16-19 are patentable at least for the reasons argued above with regard to the claims from which they depend.

Accordingly, it is respectfully requested that the rejections of Claims 1, 3-8, 10-14, and 16-19 be reconsidered and withdrawn and that Claims 1, 3-8, 10-14, and 16-19 be allowed.

Consequently for the reasons discussed in detail above no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal allowance. Therefore a Notice of Allowance is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in better form for allowance, the Examiner is encouraged to contact the undersigned representative at the below-listed telephone number.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413-2220
(OSMMN 06/04)

GJM:MLG\la
I:\ATTY\MLG\239510US-AM DUE 5-14-08.DOC

Gregory J. Maier
Attorney of Record
Registration No. 25,599

Michael L. Gellner
Registration No. 27,256

**SURINDER SACHAR
REGISTRATION NO. 34,423**

12